The Case for Diversifying Radiology Quality Metrics: How Report Turnaround Time is Damaging the Educational Mission

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Academic radiologists work hard to support many important professional missions, chief among them are education, research, and excellence in patient care. Program directors and other trainee advocates must be ever vigilant to strike the right balance between the educational interests of their residents and fellows and the needs of their group's clinical practice [1]. Inevitably, however, issues arise which pit the interests of education against those of clinical service, at times challenging the core beliefs of an academic department.

To be fair, the line separating service from education is often ill-defined, and interpretation can depend somewhat on one's fundamental view of the Graduate Medical Education (GME) landscape [2,3]. What may appear to some as a blatant misuse of residents for service needs may to others represent a vital educational experience for transitioning trainees to independent, autonomous practice. As the organization responsible for accrediting the majority of physician graduate training programs in the United States, the Accreditation Council for Graduate Medical Education (ACGME) shows great interest in this topic and routinely monitors GME programs for perceived conflicts between service and education [4].

In truth, educational activities and service activities need not be mutually exclusive of one another. Most resident and fellow curricula are comprised of assignments that are both

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educational and help to fulfill important service needs. Many would argue, for example, that the greater the number of imaging studies that residents and fellows have the opportunity to interpret during their training, the better prepared they will be for jobs in independent practice.

A CULTURE OF REPORT TURNAROUND

While the conflict between service and education is certainly nothing new to graduate medical education, radiology's continued leveraging of new technology has ushered in a rapidly evolving culture of clinical productivity and radiology value. Within the context of this new paradigm, a much more ominous clash between service and education has been gaining substantial traction over the past decade. Educators and administrators should recognize the various manifestations of this growing potential threat to education so that changes to the clinical environment can occur without undue harm to trainee education.

Academic radiology groups have absorbed substantially more clinical work over the past ten years, enabled in part by the technologies of PACS and voice recognition software. Such integrated technology has, in fact, extended the business reach of groups by allowing them to provide expert radiology services to more customers regionally, nationally, and even globally [5]. This increased clinical volume has coincided with the emergence of medicine's quality improvement culture [6], a new framework of evaluation which relies on metrics and observation to improve systems [7,8,9]. Together, these forces have created an environment

that has transformed report turnaround time (RTAT) into the de facto value center of radiology around which many workflow decisions are made [10,11,12,13].

RTAT, an easily-calculated metric of radiology efficiency, describes the elapsed time between the completion of a radiology exam and the generation of its finalized report. It represents only one element of overall report quality, which includes other criteria seemingly more difficult to quantify, such as accuracy, clarity, readability, and brevity [14,15]. RTAT's simplicity and ease of measurement, however, have made it perhaps the most-used quality metric for diagnostic radiology both within and outside our specialty [12,16,17].

The pressure to consistently improve RTAT over time has had a profound effect on radiology workflow, as success often translates into positive departmental quality dashboards, met hospital compliance targets, and even bonuses or at-risk money as a part of employee compensation plans [16,17,18]. It is in this context that the behavior of academic radiology groups, driven by the continual pursuit of better RTAT, is beginning to redefine the conventional debate between service and education.

Radiology's embrace of integrated technology has exponentially improved efficiency, resulting in turnaround times today that are measured in minutes rather than days [19,20]. RTAT can be evaluated temporally to establish month-over-month or year-over-year progress, an easy metric to provide to hospital administrators or accrediting agencies as a concrete measure of quality improvement. Other important ways in which radiologists add value to

patient care, however, are not so easily quantified or analyzed, such as valuable time spent consulting with patients, providing decision support for clinical providers, and supporting multidisciplinary conferences with subspecialty radiology input [21]. At the present time at least, radiology's measurable value may indeed be overrepresented by RTAT [16].

THREATS TO EDUCATION

Today's RTAT culture has created a new conflict between service and education that, for many programs, threatens to erode the very fabric of the educational mission. Many academic groups are making changes to their radiology workflow to achieve shorter RTATs, often in response to requests from ordering care providers, results of clinician satisfaction surveys, or self-imposed goals intended to produce data for quality bonuses or institutional quality projects [17]. When considered individually, each of these gradual RTAT-inspired changes to the workflow results in only a small loss to trainee education, but taken together they may substantially degrade the academic mission.

There are many examples of how the pursuit of improved RTAT may negatively impact trainee education. One such practice involves staff radiologists pulling dictated studies out of residents' voice recognition queues without taking the time to review the studies together at the workstation. In many cases, this practice starts as a workaround solution to a specific workflow problem, but with time it may spread widely within a department and become the modus operandi of many faculty members.

In some cases, the radiology faculty members have good intention to provide feedback to residents regarding the quality and accuracy of reports pulled from their queues. However, in practice we have found this to be fairly inconsistent and easily neglected under such a workflow paradigm. Without the benefits of immediate, specific feedback and subsequent teaching at the workstation, the strategy of pulling studies directly from trainee queues eliminates the opportunity for residents and fellows to learn from the faculty readout process, an activity that most educators feel is a highly effective means by which trainees learn. In our experience, this practice is a dangerous endeavor that risks relegating trainees to little more than report generators. Yet the lure of improving efficiency and reducing RTAT has made this a rapidly growing workflow strategy in many academic radiology departments.

Another example of how the struggle for better RTAT can impede education involves the growing practice of excluding trainees from specific studies in the daily workflow. For example, the RTAT expectation for emergency department studies might be to produce finalized reports within 60 or even 30 minutes of exam completion. At many programs, radiology faculty respond to this kind of clinical pressure by discouraging residents and fellows from picking up these high priority studies for fear that their RTAT averages will become unacceptably long [17]. The educational implications of this behavior may mean that trainees get substantially less exposure to vital domains of radiology, such as the imaging of trauma patients, stroke evaluations, or critically-ill inpatients [17]. Even at our own institution, the RTAT expectations of an entire hospital started to induce changes in faculty behavior whereby

residents were being discouraged from reading its after-hours cases. Only by acknowledging and consciously addressing the issue were we able to avoid this educational pitfall.

The RTAT-driven workflow change that appears to most substantially undermine trainee education is the expansion of faculty radiologist coverage to services that traditionally operate with only trainees. These are often call rotations that provide emergency or after-hours imaging in the kind of fast-paced environments that best mimic private practice. Providing attending radiologist coverage for these shifts certainly reduces RTAT, but at what cost to the educational mission? Losing trainee independence on these services is particularly detrimental to trainee maturation, as these experiences are essential to the stepwise transition to autonomous practice that residents and fellows need in their training [22].

Despite objections from local and national educators, opportunities for resident and fellow independence within their own training curricula are quickly disappearing from programs across the United States. Recently published results from the spring 2015 Association of Program Directors in Radiology annual survey revealed that 32% of residency programs no longer offer independent call experience for their trainees free from in-house faculty [23]. The loss of these transformational rotations can often be traced back to mounting clinical pressure for improved report turnaround [22,24].

DEFINING OUR OWN MEASURES

As academic radiologists, we need to recognize these hidden threats to education and ask ourselves several vital questions. What missions are most important to us? Are we willing to sacrifice a vital part of who we are to become only fractionally more efficient with the clinical workload? Is the most important measure of an academic radiologist reflected in the average time she or he takes to produce finalized reports? Should we settle for metrics of convenience or should we instead strive to measure a comprehensive array of value-added benefits provided by radiologists?

RTAT is certainly a valuable metric and will continue to be important for enabling radiologists to maintain their share of the imaging business. However, decisions affecting clinical workflow should be derived not just from a single clinical metric, but rather from a host of indicators that, taken together, more accurately reflect the diverse benefits that radiologists provide patients and fellow care providers [25,26,27]. Our core value as physicians should not be predicated solely on the wait time for a finalized report, implying that the best radiologists are simply the fastest.

We need instead to consider new meaningful measures for many of the value-added benefits that radiologists uniquely provide, including image and interpretation quality, decision support for clinicians, second interpretations, patient safety, cost containment, medical informatics, and healthcare information technology [21]. That RTAT may have too large a role in current radiology quality metrics may be partially the fault of radiology itself. It is imperative

that we first define and then utilize new measures that best reflect radiology's many benefits to patients, clinicians, hospitals, and the health care industry.

Using practice improvement metrics based on radiology's numerous value-added domains will relax the stress being placed on educational programs by diversifying the quality improvement focus of academic radiology groups. Establishing simple, functional metrics for these other value domains may prove difficult, however, as they tend to be more qualitative in nature and may be difficult to track electronically. We hope that stakeholders including the American College of Radiology will make a priority of diversifying radiology quality measures to help preserve the educational mission of academic radiology and improve our value as care providers.

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